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## SOME NOTES ON THE REGULATION OF GAS SERVICE

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The ideas expressed herein are based on the experience of several years in actual inspection of gas service, and upon two or three fundamental concepts as to the relations between the public and a utility corporation, and as to the object of any rules or requirements to be promulgated.

First. I assume that a utility accepting a franchise allowing it special privileges in the use of public property, without which it would be unable to do business at all, or at least without prohibitive cost, utilizing these privileges without adequate payment for same, must therefore be obligated to give the best possible service and lowest prices consistent with a fair reward for conducting and improving the business.

Second. I assume as operative, the modern conception that the proper public officials have and exercise the right to investigate conditions and cost of service, to fix standards of service, and to determine a reasonable selling price.

Third. I assume that any assumption of regulatory powers is either to safeguard the public health and safety, or to produce the greatest measure of service for the least cost.

With this modern viewpoint, we can divide regulatory requirements into several groups:

1. Fullest measure of service to any and all consumers in the community ready to pay the reasonable price, consistent with the principle that the cost of serving any one consumer or group be not so out of proportion to usual costs as to put an undue burden on the balance of the consumers.

2. A minimum average standard of effectiveness of the service rendered which subdivides into (a) inherent qualities of the gas and (b) condition of delivery to the consumer.

3. Means of measuring service both as to quantity and quality.

4. Price to be paid for the unit of measure of service.

5. Methods of inspection, to determine that requirements are met.

### *1. Fulllest Measure of Service to Consumers*

To develop the idea a little more clearly, a citizen of the town or city who happens to reside so remote from other citizens that it would cost hundreds of dollars to lay mains to reach him from the nearest point of reasonable consumption, his probable business representing almost no returns on the investment, cannot in justice expect such special investment. Neither should service to an individual citizen be denied because probable consumption would not pay regular profits on cost of reaching him. As a taxpayer and inhabitant, he contributes in a variety of ways to the successful maintenance of the more closely settled districts, where it is easy to figure profits on each customer which insure the success of the utility. Therefore, an expense of installation, somewhat greater than that which his particular business at that point will pay a usual or average profit upon, is his of right. How to generalize this expense must be left to local calculation. The basis sometimes used of 100 feet appears to me to be too small, probably 200 to 250 feet from nearest previous installation would not be unreasonable.

### *2. Minimum Average Standard of Effective Service*

Inherent useful qualities are those for which the gas is bought, namely, as a source of light and heat. Under present conditions and as far as we can see in the immediate future, it is not economical to distribute in ordinary towns and cities distinctly low grade gas (that is gas with small heating power per unit of volume) because of the great expense of a distribution system of sufficient capacity. Under present conditions, methods of manufacture producing a quality of gas economical to distribute, produce gas of good heating value and of some open flame illuminating value. Since the great bulk of the gas sold, as well as the requirements of the greatest number of consumers is for heating effects, it is sufficient to establish a standard for heating value only. American standard practice calls for 600 B.t.u. gross per cubic foot. European practice utilizes much gas at about 500 B.t.u. with excellent results. This standard as well as all others must be therefore set at such a figure as prevents careless operation, but permits of utilization of serviceable gas which, while possibly of lower B.t.u. than other grades, may be distributed and sold at such

a figure as to give more service at less cost, compared with gas meeting a higher requirement. I consider that a range of requirement calling for a monthly average of either 500, 550 or 600 B.t.u. gross, depending on local conditions, should be sufficient with no requirement as to candle power.

For good service it is necessary that this heating value does not radically or frequently change, as might happen if high B.t.u. natural gas should occasionally be mixed with ordinary coal gas. With only a heating power requirement for the gas, it might be possible to limit the fluctuation to 75 or 100 B.t.u. above the minimum required, or possibly better, a fluctuation of not more than 75 to 100 B.t.u. at any consumer's supply, above the minimum actually delivered at that consumer's supply, based on monthly series of tests. While such a rule has never been discussed to my knowledge, my experience would indicate its feasibility and its desirability in preventing irregularity of service.

Other inherent qualities are associated with the possible presence of preventable impurities in the unburned gas. Impurities in the unburned gas are only of interest when they affect the quality of service by corroding or stopping up fixtures, and producing obnoxious products of combustion. I believe it is a fair requirement that the presence of hydrogen sulphide be kept down to only traces when gas is tested with lead acetate paper, for in removing this impurity other impurities are largely eliminated, or the manufacturer of gas is obliged to use fairly good materials to avoid excessive expense in removing hydrogen sulphide. I would omit all requirements as to the total sulphur, ammonia, tar, or chemical constitution.

In the matter of delivery of gas to the consumer we have to consider conditions of pressure in the supply pipes, and means of measuring the amount of gas consumed.

A requirement of not less than 2 inch water column pressure at the consumer's meter at all times is essential to passable service and safety. It insures continuity of service. I do not believe it wise or necessary to fix an upper limit for pressure but it is essential to fix a limit on the daily and monthly fluctuation in pressure at any consumer's meter or service pipe. Not setting a maximum allowable pressure, I cannot set the limits in fluctuation as now customary, on a percentage of the minimum or maximum actually reached. I incline to a definite range in inches. I find a limit of 2-inch fluctuation

can be readily realized and it is not inconsistent either with good service or reasonable cost. Not over 3-inch fluctuation should be tolerated in any ordinary circumstance. Since all evidence goes to show the possibilities of more efficient utilization by the consumers of gas under high pressure, and higher pressure increases the capacity of an existing distribution system thus reducing capital charges, no hindrance should be placed on the use of higher pressures than now prevail, except that the gas utility should give due and direct notice to all consumers that a definite change in usual pressure is to be made, and then follow up the change with assistance in readjusting appliances to the new condition. The progress of the industry for most consumers should not be held back to enable a few consumers to continue to use antiquated appliances, which is too nearly the attitude of the present service requirements.

### *3. Means of Measuring Service*

The present day commercial gas meter is an instrument of fair but not close accuracy. Without undue expense it can be made and kept so as to register more accurately than normal conditions affecting the volume of gas itself can be maintained. That is, the temperature and barometrical changes in the course of the seasons cause a variation in the volume occupied by a given amount of gas substance of from 10 to 15 per cent under ordinary conditions. Therefore attempts to hold meters to a very close degree of accuracy at considerable expense are unjustifiable. It is a fair requirement that all meters when put in service shall be in good order, that they shall have been carefully adjusted to register between 98 per cent and 101 per cent of correct where tested by usual commercial method, such final adjustment preferably being verified and meter sealed by a sworn tester; that meters should not remain in service longer than five years before being removed, tested for accuracy and inspected; and that consumers suspicious of the accuracy of their meters have the right to have their meters tested by a sworn tester at any time by paying a part of the cost of the test. A meter so removed for test and showing within 3 per cent of correct registration should be considered commercially correct, any excess of 3 per cent to be the subject of allowance on bills for not exceeding preceding six months' service of that meter. Probably the return by the company to the

complaining consumer of his deposit towards expense of test in case his meter is fast beyond 3 per cent is justifiable as a penalty against the company, since the company should expend sufficient money to maintain its meters within 3 per cent, and if it has not done so the individual consumer should not have to pay the large proportion on his particular meter. Any such penalties ought to be charged against the profit account of the utility and not reckoned as operating expense. Consideration of the construction of meters and experience show that in common sizes of gas meters, if properly adjusted when put in service, they cannot get faster than 5 or 6 per cent, while leaks developing may cause any percentage slow up to 100 per cent or non-registration.

#### *4. Price*

Under our assumption that price is subject to adjustment on basis of costs of production, etc., it is as much a matter of justice to the average consumer that slow meters be not left in service, as that individuals shall not suffer from excessive charges due to fast meters. The fundamental idea is that the cost of production shall be figured on the same relative amount of material as is delivered to and paid for by the consumer.

#### *5. Methods of Inspection*

The extent of the inspection depends on the ratio of cost of the same to the business done. A fundamental principle is that those who benefit by the inspection pay the cost and not the general taxpayer. So a logical situation is that, in figuring the selling price, a certain small allowance be made for cost of supporting public inspection, say 1 mill per thousand cubic feet sold. This money should be turned over to the proper public authority, which shall expend it wholly in inspection work as it sees fit, unhampered in any way by the company. The inspector's equipment, be it meagre or extensive, should be at all times wholly in his control, also tests made by him at any and all times and the service rendered judged by them, subject only to the privilege of the company occasionally to inspect and test the apparatus and observe the methods used, that it may be informed of the conditions under which tests are made. But this privilege in no wise gives the company a right to be notified when and where tests are to be made or to participate in the tests and have

their tests part of the results reported as the inspector's tests. Also, whatever tests are made by the inspector upon which complaint of poor service is based must be sufficient in number and obtained in localities to be typical of average or ordinary service conditions.

The question of the location of the test places is immediately associated with the standard of service adopted, especially in our larger cities. The financial success of high pressure and long distance transmission favors the concentration of manufacture. Even well-made gas commonly decreases in candle power and heating value by transmission. In the old days of relatively short transmission, a distance of a mile from works was adopted as giving an average condition, but such is far from being the case in many large and some small cities. Standard and test conditions which are more or less fictitious as compared with real results to most consumers should be avoided. Therefore, a standard low enough to ensure the more distant consumer a definite value and tests made to meet that requirement should be provided for. For this reason I avoid stating a certain distance or location and prefer a requirement based on "any consumer's meter," possibly qualified to exclude consumers in extremely bad situations where conditions are especially deleterious to the quality of gas used, such situations not approximating to the average conditions of any considerable number of consumers.

To summarize the principles of requirements, rules should be as few as possible and only those which tend to emphasize the important features of the service and can be readily verified. Such rules should really measure the service to all consumers in ordinary situations in the territory served, should be flexible enough to allow the introductions of improvements without delay, should be ample to insure uniformity of service within commercial possibility and reasonable expense, and rigid enough to prevent careless or slipshod methods in management. All regulations should be held subject to change upon demonstration that any suggested change means more service for less cost to the majority of consumers, even if such change disturbs the occasional consumer who wants to avoid purchasing modern efficient apparatus, or altering his routine. Our present regulations on the gas industry seem to consider far too much the desires of the unprogressive members of the community, a consideration which is not given in matters of transportation, water, electricity and other utilities.

Rules relating to service must not be formulated on the basis of

obtaining the best possible in service only, but with a clear idea of the effect on the cost of the whole service. The whole matter, under right conditions, is the simple financial question of how to get the largest measure of satisfactory use from the dollar expended.

Of course, in communities having little or no control over the selling price, but authorized to regulate quality of service, the only way to get the most for their money is to raise the standard as high as possible, so 600 or 625 B.t.u. and even a candle power requirement of 18 to 22 is justifiable, and ought to be enforced if conditions indicate that the utility can get a fair return at its fixed price.